

User-Programmable Low-Overhead Multithreading

Abstract of the Invention

A virtual multithreading hardware mechanism provides multi-threading on a single-threaded processor. Thread switches are triggered by user-defined triggers. Synchronous triggers may be defined in the form of special trigger instructions. Asynchronous triggers may be defined via special marking instructions that identify an asynchronous trigger condition. The asynchronous trigger condition may be based on a plurality of atomic processor events. Minimal context information, such as only an instruction pointer address, is maintained by the hardware upon a thread switch. In contrast to traditional simultaneous multithreading schemes, the virtual multithreading hardware provides thread switches that are transparent to an operating system and that may be performed without operating system intervention.